operation, it may be added, is performed in the autumn. These experiments in practical forestry have excited great interest among foresters. It is hoped that the matter will be taken up in a scientific way, and that the chemical action of the impregnated sap will receive elucidation in a form which will be of practical use to the owners of woodlands throughout the country.

*Bulletin* No. 4 (vol. iv.) of the Laboratories of Natural History of the State University of Iowa is entirely occupied by two papers: On the Cyperacea of Iowa, by Mr. R. J. Cratty; and on American Uredineæ (part 2), by Messrs. J. C. Arthur and E. W. D. Holway. Both papers are well illustrated.

We have received the *Proceedings* of the Agricultural Research Association for 1898. In its report, the Committee calls especial attention to the experiments carried on by the Association, under the direction of Mr. Thomas Jamieson, on the cross-fertilisation of the oat, resulting in the production of new valuable varieties by natural cross-pollination rather than by any artificial assistance.

Among the lectures to be delivered at the Royal Victoria Hall, Waterloo Road, on Tuesday evenings during March, are the following:—March 7, "The Scenery of Alpine Lands," Mr. E. J. Garwood; March 14, "The Atmosphere," Morris W. Travers; March 28, "Mont Blanc, the Great White Mountain," Mr. J. Russell.

Among the papers in the winter number of *Brain*, is the presidential address delivered to the Neurological Society by Prof. Victor Horsley, F.R.S., on the determination of the energy developed by a nerve centre, and a contribution on an experimental study of visions, by Dr. Morton Prince.

Under the title of "An experiment in commercial expansion," Mr. Leonard Courtney, M.P., delivered in December last a presidential address to the Royal Statistical Society, dealing with the economic lessons taught by a study of the commerce and development of the Congo Free State. The address is now published in the Society's *Journal*.

A brief summary has been published at Philadelphia of a voluminous report drawn up for the Japanese Government by Tentearo Makato on "Japanese notions of European political economy." The report contains, *inter alia*, a summary of the main views of leading political economists as they presented themselves to the mind of the Japanese Commissioner.

A bi-monthly magazine devoted to the study and protection of birds, edited by Mr. Frank M. Chapman, and published by the Macmillan Company, New York, has just appeared under the title of *Bird Lore*. The journal will be the organ of the Audubon Societies, and will provide students of bird-life with interesting articles and notes and pictures. The fact that during the past six years New York and Boston publishers have sold more than seventy thousand text-books on birds, promises success to this popular journal of ornithology.

In a recent note in these columns attention was drawn to the reported discovery by M. Jaubert of a substance capable of removing from the air of a closed chamber the carbonic acid, water vapour and other irrespirable gases produced by a living animal within the chamber, and at the same time of keeping up the supply of oxygen. In the *Comptes rendus* for February 6, the subject is referred to in two communications. MM. Desgrez and Balthazard describe experiments made with sodium peroxide. This substance is acted upon by water according to the following equation, $Na_2O_2 + H_2O = 2NaOH + O$. The caustic soda produced will, of course, absorb carbon dioxide. A guinea-pig weighing 400 grammes, when enclosed in 10 litres of air, was asphyxiated in from two to two and a half hours; but under similar conditions when sodium peroxide was placed in the enclosure, and water allowed to drop on it, a guinea-pig showed no diminution of vitality at the end of four hours. To see if the moisture of expired air would suffice to act on the peroxide, two guinea-pigs were enclosed in 30 litres of air with 66 grammes of peroxide. They were taken out alive at the end of ten hours, whereas two others of the same weight died at the end of four hours in the absence of peroxide. Finally a dog weighing 6·5 kilogrammes, enclosed with 70 litres of air and 200 grammes of peroxide, gave unequivocal signs of life at the end of six hours. The peroxide was only attacked superficially in the last cases, owing probably to the formation of a protective layer of carbonate.

In discussing the above experiments, M. d'Arsonval points out that seventeen years since he proposed an effective method of achieving the same end. The animal is enclosed hermetically in a tubulated receiver; the upper part of this contains a receptacle filled with pieces of soda-lime; through the tubulus a solution of hydrogen peroxide, coming from a Mariotte's bottle, is conducted by a tube so as to drop into a strong solution of chromic acid. The apparatus works automatically, for as the animal breathes and the carbon dioxide and water are absorbed by the soda-lime, the pressure falls and the Mariotte's bottle comes into action. The hydrogen peroxide solution then begins to drop into the chromic acid, and disengages oxygen until the pressure is restored. The flow from the Mariotte's bottle then stops, and the cycle begins again.

The additions to the Zoological Society's Gardens during the past week include a Rhesus Monkey (*Macacus rhesus*, ♀) from India, presented by Mrs. A. J. Pauley; a Mozambique Monkey (*Cercopithecus pygerythrus*, ♂) from East Africa, presented by Mr. E. Tudor Johnson; a Bonnet Monkey (*Macacus sinicus*, ♀) from India, presented by Mr. J. H. Howden; a Coypu (*Myopotamus coypus*) from South America, presented by Mr. Sidney Grey; a Restless Cavy (*Cavia porcellus*) presented by Miss Druce; a Canadian Lynx (*Felis canadensis*); a Prairie Wolf (*Canis latrans*) from North America, presented by Mr. Henry Anger; two Mountain Ka-Kas (*Nestor notabilis*) from New Zealand, presented by the Hon. Walter Rothschild, M.P.; an Alexandrine Parrakeet (*Palaeornis alexandri*, ♀) from India, presented by Mr. A. Pam; a Beccari's Cassowary (*Casuarius beccarii*) from Vokan Island, Aru Islands; a Mauve-necked Cassowary (*Casuarius violicollis*) from Terangan Island, Aru Islands; a Salvadori's Cassowary (*Casuarius salvadori*), a Milne-Edwards Cassowary (*Casuarius edwardsi*) from North-west New Guinea, two Yellow-naped Cassowaries (*Casuarius occipitalis*) from the Island of Geelvink Bay, New Guinea; three Reeves's Terrapins (*Damonia reevesi*); three Black-headed Terrapins (*Damonia reevesi unicolor*) from China, deposited; two Red-breasted Mergansers (*Mergus serrator*, ♂ ♀), European; two Bahama Ducks (*Poecilonetta bahamensis*) from South America, nine Spotted-billed Ducks (*Anas poecilorhyncha*), a Bar-headed Goose (*Anser indicus*) from India, five Brent Geese (*Bernicla brenta*), European, purchased.

## OUR ASTRONOMICAL COLUMN.

United States Naval Observatory.—Prof. A. N. Skinner, one of the staff of this well-known observatory, contributes to *Science* (vol. ix., No. 210, pp. 1–16, January 6) a detailed history of the institution from its first inception to the present time. He divides the time into four periods, each characterised by some decisive change, both in the scope and administration of the department. In 1823, J. Quincey Adams,

© 1899 Nature Publishing Group

the U.S. President, strongly urged the foundation of a depôt for the charts and instruments necessary for the navy; but it was not until 1830 that consent was given to this, when Lieut. Gouldsboro established one at Washington, the only astronomical equipment being a 30-inch focus transit. Three years later the contents were removed to a room about 14 feet square on Capitol Hill. Here the equipment was increased by a 3⅜ in. transit, a Borda's circle, 3 ft. 6 in. focus achromatic, a portable transit, and sidereal clock. Up to this time the work of the institution entirely consisted of such astronomical observations as were necessary for the rating of chronometers. In 1838 a new epoch was entered upon by the instalment of Lieut. Gilliss, who at once improved the equipment and commenced systematic observations of the moon, eclipses and occultations, and also began the determination of right ascensions of standard stars. He soon reported to the Government that the housing of the instruments and charts was unsafe, and asked for better accommodation. It was not until 1842, however, that this request was acceded to, but in that year a Bill was passed voting 25,000 dollars for a new observatory. To prepare for it, Gillis visited all the European observatories and gave orders for the best instruments then available. The site selected was close to the Potomac River, and about 100 feet above the water.

In September 1844, the new observatory was ready for use with a fine equipment of first-class instruments; but, strange enough, the man who had evolved the whole of the arrangements, Lieut. Gillis, was not selected as superintendent, this post being given to Lieut. Maury, who occupied the position until 1861. During his incumbency the chronograph was introduced into the observatory, and it is of interest to read that for the use of a magnetic clock, fillet chronograph and cylinder chronograph, Dr. Locke was in 1849 paid the sum of 10,000 dollars. Maury's scheme of work was so wide that the reductions soon fell behind, and an enormous mass of work remained unpublished when he left in 1861. Gillis succeeded him, and again infused new life into the place. He resumed the meridian work, which had been almost neglected, and started to complete the reductions of previous observations. In June 1866, the observatory was relieved of a great part of its labour by the creation of the Hydrographic Office, which then took charge of all the charts, chronometers, sextants, &c. Later on, however, in 1883, most of this work came back to the institution. Daily time signals were originated in August 1865, by Prof. Harkness, and were transmitted by hand until 1879, when an automatic distributor was installed. The large 26-inch object-glass was received in 1873.

Magnetic observations had been started under Maury in 1845, but no progress was made until 1887, when a complete outfit was provided for obtaining continuous photographic records of all the magnetic elements.

In 1893 the observatory was again removed to its present site on Georgetown heights, 280 feet above the Potomac; it covers a circle having a radius of 1000 feet, and an area of about 70 acres. The principal work of the observatory is to carry forward a continuous series of meridian observations of the sun, moon, planets and ephemeris stars, which form the basis of the requisitions of the navy. Other work, however, has by no means been neglected, as is shown by the lengthy list of published observations and discoveries in the article. It is significant to notice that the magnetic observations have been entirely suspended at the new observatory since the summer of 1898, the results being vitiated by the electric roads in the vicinity.

USE OF TELEPHOTO LENS IN ASTRONOMY.—Dr. Rudolf Steinheil, of the famous German firm of opticians, contributes to the *British Journal of Photography* (vol. xlvi. p. 102) an article discussing, from experimental data, the extent to which the telephoto combination may be useful to astronomers. For stellar work he thinks it will be little used, as for delineating faint objects it is unfitted on account of its relatively low speed, and for successfully defining double stars, &c., it would necessarily have to be of large aperture. For the planets it is scarcely more fitted, the prolonged exposures necessary causing loss of definition owing to inaccuracies of following. The field of its use for astronomical purposes will probably thus only include the sun and moon. In the case of the moon the success will depend on the degree of magnification required, as if this is pushed too far the image becomes feeble, and the difficulties due to the moon's motion in declination, which are not remediable by using a driving-clock, render the result uncertain. With the sun, however, all the difficulties encountered with other objects disappear, as the light available is sufficient to allow of instantaneous exposures with the largest amplifications. This Dr. Steinheil thinks will be the only permanent use of the telephoto lens for astronomical purposes, and he instances cases in which photographs of sun-spots have been obtained measuring 7 mm. without sacrificing detail.

VELOCITY OF METEORS.—Prof. G. F. Fitzgerald writes in the *Astrophysical Journal* (vol. ix. p. 50, January 1899), suggesting the preparation for attempting to determine the velocity of the meteors during the next prominent showers. All that is required is an arrangement whereby a toothed wheel may be rotated in front of the camera lens during the exposure. The motion must be uniform, and we must know the rate of rotation and number of teeth on the wheel, and design these so that there may be two or more eclipses during the passage of the meteor across the field. Other methods of breaking up the image are given, such as an oscillatory motion of the lens or plate, or pointing the camera to a moving mirror; but in all these cases distortion of the star images would follow, and hence the advantage of the simple eclipsing arrangement.

It would probably be possible with some such arrangement as that suggested, to determine the meteor velocity with sufficient accuracy to show whether there is any sensible change due to the resistance of the atmosphere.

It is also evident that if two such cameras were employed at stations a considerable distance apart, and the same meteor caught by each, that the information given by the two would be extremely valuable.

---

## THE FISHES OF THE NILE.

A MEMORANDUM regarding a proposed survey of the Nile, with the object of determining the species of fishes inhabiting its waters, has been drawn up by Dr. John Anderson, F.R.S., and is here printed in full, as it will interest all biologists. We are informed that the scheme, as detailed in the memorandum, has been sanctioned, and that Mr. W. Leonard S. Loat has been appointed superintendent. The only modification which has been made in the scheme, as detailed in the memorandum, affects the permanent use of a steam launch, as there was a practical difficulty in procuring one. The occasional use of a steam launch for trawling purposes will be available. This slight departure will in no way interfere with the efficiency of the survey.

Lord Cromer, whom Dr. Anderson approached on this subject in November last, has taken a most lively interest in the scheme throughout. The subjoined memorandum was drawn up at his request, and he has provided the funds necessary for the accomplishment of the Survey.

Our knowledge of the fishes of the Nile appears as yet to be very imperfect. It may be said to have taken its origin in 1750, when Hasselquist described thirteen species found in the deltaic area or in its immediate proximity. Since his time a number of distinguished men, *e.g.* Forskål, Geoffroy St.-Hilaire, Rüppell and others, have contributed by their observations personally carried out on the banks of the river to make its fishes more and more known.

By far the most important addition to our knowledge of the fishes of the Nile, after Hasselquist's day, was that made by Geoffroy St.-Hilaire in the "Description de l'Égypte," in which twenty-nine species were described and figured. Between 1829 and 1832, Rüppell published two valuable contributions to the subject. De Joannis, who accompanied an expedition to Luxor, somewhere about 1830-34, seems to have undertaken a careful investigation of the fishes of that locality during his brief visit. The value attached to his work rested largely on the fact that his descriptions, which were published in 1835, were illustrated by figures of each species drawn and coloured from life; moreover, he had not depended solely on the fishermen for his material, as not a few of the species were of no economic use and have not been rediscovered since. He described fourteen species in all, nine of which were new to science. His paper was supplemented by a list of all the known species of fishes inhabiting the Nile, including Rüppell's observations up to 1832; hence he enumerated fifty-three species.

In 1837, the third contribution of Rüppell appeared; but he was seemingly unaware of Joannis's researches at Luxor, and consequently he mentioned only fifty-five in his summary of the species then known to inhabit the river. The fishes collected by Russegger in Egypt enabled Heckel, in 1847, to raise the

© 1899 Nature Publishing Group